

What is claimed is:

1. In an apparatus of the character described for introduction into the vessel of a patient, a guiding catheter adapted to be inserted into the vessel of the patient, and a device adapted to be inserted into the guiding catheter, the device including a flexible elongate member, a sleeve carried by the flexible elongate member near the distal extremity thereof and extending from a region near the distal extremity to a region spaced from the distal extremity of the flexible elongate element, the device also including a guide wire adapted to extend through the sleeve so that the guide wire can be positioned so that it extends from the distal extremity of the flexible elongate member, through the sleeve and rearwardly of the sleeve alongside of and exteriorally of the flexible elongate element into a region near the proximal extremity of the flexible elongate element.

2. Apparatus as in Claim 1 wherein said device includes a balloon dilatation catheter having said flexible elongate member forming a part thereof.

3. Apparatus as in Claim 2 wherein said balloon dilatation catheter includes a balloon near the distal extremity thereof and wherein the sleeve for the guide wire extends through the balloon.

4. Apparatus as in Claim 3 wherein said balloon is concentric with respect to said sleeve.

5. Apparatus as in Claim 3 wherein said balloon dilatation catheter includes a balloon inflation lumen extending through the flexible elongate element.

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6. Apparatus as in Claim 5 wherein said balloon dilatation catheter includes a lumen for performing dye injection/pressure measurements.

5 7. Apparatus as in Claim 5 wherein said balloon dilatation catheter includes an additional sleeve carried by the flexible elongate element and extending into the balloon inflation lumen and extending out of the balloon inflation lumen together with a vent tube disposed in the additional sleeve for venting air from
10 the balloon to the atmosphere when the balloon is being filled with a liquid.

15 8. Apparatus as in Claim 1 wherein said flexible elongate element is provided with a lumen extending the length thereof, said lumen being capable of being utilized for making pressure/dye measurements.

9. Apparatus as in Claim 8 wherein said sleeve carried by the flexible elongate element has its distal extremity extending in a curved manner over the distal extremity of the flexible elongate member.

20 10. Apparatus as in Claim 1 wherein said flexible elongate member is in the form of a fiber optic cable.

25 11. Apparatus as in Claim 1 wherein said flexible elongate element has a lumen extending therethrough and wherein said flexible elongate element is provided with spaced apart sets of holes extending through the flexible elongate element and being in communication with the lumen extending through the flexible elongate element.

12. Apparatus as in Claim 1 wherein said guiding catheter includes a y-connector having an o-ring fitting therein and wherein the guide wire is adapted to extend through the y connector together with a holder, said holder having means for supporting the y connector, and means for frictionally retaining the guide wire extending from the y connector.

13. In an angioplasty apparatus adapted to be inserted into the vessel of a patient, a guiding catheter, balloon dilatation catheter including a flexible elongate element having a balloon inflating lumen extending therethrough, a balloon, means for establishing a fluid-tight connection between the balloon inflating lumen and the balloon so that the balloon can be inflated and deflated, a sleeve extending through the balloon and extending rearwardly from the balloon and extending alongside and exteriorally of the flexible elongate element, said sleeve having a guide wire lumen extending therethrough and a guide wire extending through the sleeve and extending beyond the distal extremity of the flexible elongate element and extending rearwardly from the sleeve alongside and exteriorally of the flexible elongate element into a region adjacent the proximal extremity of the flexible elongate element.

14. Apparatus as in Claim 13 together with means forming a dye injection/pressure measurement lumen extending along the length of the flexible elongate element and extending through the balloon to the distal extremity of the dilatation catheter.

15. Apparatus as in Claim 13 together with an additional sleeve carried by the flexible elongate

element and extending from the interior of the balloon to the exterior of the flexible elongate element and a vent tube removably disposed within the sleeve.

5 16. In a method for performing an angioplasty procedure in which a guiding catheter is disposed in the vessel of the patient and in which a device is to be inserted into the guiding catheter, the device including a flexible elongate element and a sleeve carried by the flexible elongate element extending from approximately the distal extremity thereof rearwardly of the flexible elongate element for a distance of approximately 10 centimeters, the device also including a guide wire, the method including the steps of taking the proximal extremity of the guide wire and inserting it in the distal extremity of the sleeve and pushing it rearwardly through the sleeve until it exits from the sleeve and then further advancing the guide wire so that the guide wire extends alongside and exteriorally substantially the entire length of the flexible elongate element, inserting the device into the guiding catheter with the guide wire thereon, advancing the guide wire ahead of the device to position the guide wire in the desired location in the vessel, and thereafter further advancing the device on the guide wire until the device is positioned in the desired location for performing an operation with the device, and removing device from the guide wire while the guide wire remains in place.

30 17. A method as in Claim 16 together with the step of selecting another device to be utilized in the patient and picking up the proximal extremity of the guide wire and inserting it into the tip of the sleeve and pushing the guide wire rearwardly of the sleeve and continuing

to advance the flexible elongate element on the guide wire until the flexible elongate element is positioned in the desired location for performing the desired operation and thereafter removing the flexible elongate element and the guide wire from the guiding catheter and removing the guiding catheter.

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(claims 18-29)

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